PATENT ABSTRACTS OF JAPAN

(11)Publication number : 11-338332
(43)Date of publication of application : 10.12.1999

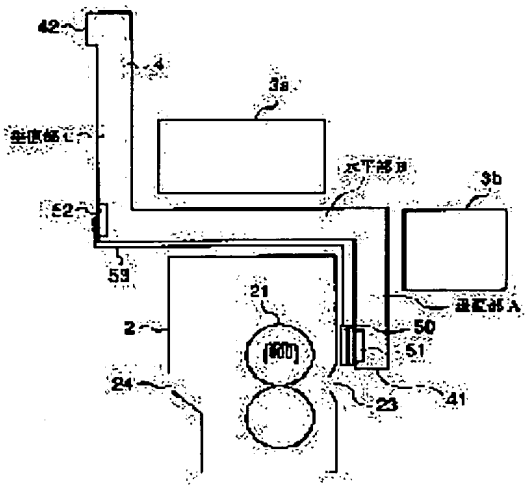
(51)Int.Cl. G03G 21/20
B41J 29/377
G03G 15/00
G03G 15/20

(21)Application number : 10-141685
(22)Date of filing : 22.05.1998

(71)Applicant : FUJI XEROX CO LTD
(72)Inventor : NAKAYAMA YUTAKA
NISHIDA MASAYOSHI
ICHIKAWA YOSHIHIKO

(54) HEAT INSULATING DEVICE FOR IMAGE FORMING DEVICE

(57)Abstract:
PROBLEM TO BE SOLVED: To effectively perform heat insulating by providing a cooling part on a first position inside a ventilation duct, and also a heat radiating part on a second position on an exhaust port side inside the ventilation duct from the first position.
SOLUTION: As to this heat insulating device interrupting the heat transmission from a heat source part 2 inside an image forming device to a part 3 to be protected; the exhaust port 42 is provided above the part 2 and a suction port 41 is provided below the port 42. Besides, the ventilation duct 4 is provided between the parts 2 and 3, and a heat exchange device radiating heat absorbed from the cooling part 51 to the heat radiating part 52 is provided. The part 51 is set on the first position inside the duct 4, and also the part 52 is set on the second position on a port 42 side inside the duct 4 from the first position. Thus, temperature difference occurs in atmosphere in the vicinity of the first and the second positions, and air convection inside the ventilation duct occurs by chimney effect, so that heat transmission from the part 2 to the part 3 can be interrupted.



LEGAL STATUS

[Date of request for examination]

[Date of sending the examiner's decision of rejection]

[Kind of final disposal of application other than the examiner's decision of rejection or application converted registration]

[Date of final disposal for application]

[Patent number]

[Date of registration]

* NOTICES *

1.This document has been translated by computer. So the translation may not reflect the original precisely.
2.**** shows the word which can not be translated.
3.In the drawings, any words are not translated.

CLAIMS

[Claim(s)]
[Claim 1] In the thermal insulation equipment which interrupts transfer of the heat from the heat-source section to the protected section in image formation equipment The aeration duct which is equipped with the exhaust port established more nearly up than the above-mentioned heat-source section and the inlet caudad prepared rather than the exhaust port, and is prepared between the above-mentioned heat-source section and the above-mentioned protected section, Thermal insulation equipment of the image formation equipment characterized by installing the above-mentioned radiator in the second location by the side of the exhaust port in an aeration duct rather than the first location concerned while having heat exchange equipment which emits the heat absorbed from the cooling section to a radiator and installing the above-mentioned cooling section in the first location in an aeration duct.
[Claim 2] Thermal insulation equipment of the image formation equipment according to claim 1 whose first location of the above is near [above-mentioned] the inlet.
[Claim 3] The above-mentioned aeration duct is thermal insulation equipment of claim 1 whose second location of the above it has the vertical section or ramp which makes it a lower limit except the inlet, and is near the lower limit of the vertical section concerned or a ramp, or image formation equipment given in either of 2.
[Claim 4] Thermal insulation equipment of the image formation equipment according to claim 1 to 3 which the above-mentioned heat-source section is an anchorage device, and prepares the first and the second inlet near feed opening of the anchorage device, and the delivery opening, respectively.

[Translation done.]

* NOTICES *

1.This document has been translated by computer. So the translation may not reflect the original precisely.
2.**** shows the word which can not be translated.
3.In the drawings, any words are not translated.

DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[Field of the Invention] This invention starts in more detail the cure against heat generated in such image formation equipment about the image formation equipment of electrophotography methods, such as an electrophotography copying machine and a printer.
[0002]
[Description of the Prior Art] From the former, what forms a toner permanent image in a record sheet is widely known according to each process of electrification, exposure, development, an imprint, fixing, and cleaning as image formation equipment of this kind of electrophotography method. By the way, there is a possibility that various faults may arise, with the heat generated within such image formation equipment, and the cure against heat is an important problem in the design of image formation equipment.
[0003] For example, at the fixing process of an image formation process, there is a possibility of causing problems, such as fusion of a toner [/ in cleaning equipment and a developer etc.], fixing, promotion of degradation of a photo conductor ingredient, and malfunction of electronic parts, with the heat which generates the non-established toner image held on the record sheet in that case although established on a record sheet according to an operation with heat and a pressure.
[0004] Therefore, from the former, the heat dissipation side is turned to the image formation equipment exterior, the endoergic side is turned to the interior of image formation equipment, the Peltier device which is a heat-transfer element is attached in the case base frame of image formation equipment as a cure against heat in image formation equipment, at JP,64-59257,A, and the technique of circulating the ambient atmosphere further cooled by the endoergic side of a Peltier device in [whole] image formation equipment by the fan is proposed. Moreover, the endoergic side of a Peltier device is pasted up on covering of the anchorage device unit of image formation equipment, and the technique which cools the anchorage device itself is proposed by JP,4-270361,A.
[0005]
[Problem(s) to be Solved by the Invention] However, with the technique indicated by JP,64-59257,A, in order to exhaust using a fan, the noise tends to pose a problem. It is hard to apply to especially the image formation equipment installed in quiet environments, such as a library. Furthermore, since the ambient atmosphere cooled by the Peltier device is circulated inside [whole] image formation equipment, it is possible that the power consumption of a Peltier device also becomes large as well as a fan's power consumption.
[0006] Moreover, although the noise can be suppressed low and the temperature of the anchorage device itself can be lowered with the technique indicated by JP,4-270361,A, if the heat from the heat dissipation side of the Peltier device attached in an anchorage device is taken into consideration, since the heat which will be generated if it sees as the whole image formation equipment will increase, it cannot be said that the cure against heat is not necessarily enough. When the miniaturization of image formation equipment progresses further, an anchorage device, cleaning equipment, etc. approach and it comes to be prepared especially, there is a possibility that it cannot respond, with this technique. Furthermore, more power is needed, in order to attach the endoergic side of a Peltier device in an anchorage device soon and to maintain the heating roller of an anchorage device etc. at predetermined temperature.
[0007] This invention is made in view of the above-mentioned trouble, the purpose can be insulated effectively, there is little noise, and it is in offering the thermal insulation equipment of image formation equipment excellent in energy efficiency.

[0008]
[Means for Solving the Problem] In the thermal insulation equipment with which this invention interrupts transfer of the heat from the heat-source section to the protected section in image formation equipment in order to solve the above-mentioned technical problem The aeration duct which is equipped with the exhaust port established more nearly up than the above-mentioned heat-source section and the inlet caudad prepared rather than the exhaust port, and is prepared between the above-mentioned heat-source section and the above-mentioned protected section, While having heat exchange equipment which emits the heat absorbed from the cooling section to a radiator and installing the above-mentioned cooling section in the first location in an aeration duct, the above-mentioned radiator is installed in the second location by the side of the exhaust port in an aeration duct rather than the first location concerned.
[0009] Since the thermal insulation equipment of image formation equipment was constituted in this way, while cooling the ambient atmosphere of the first location in an aeration duct by the cooling section The ambient atmosphere of the second location in an aeration duct is warmed with a radiator, an air-temperature difference is produced between the second location for a start in an aeration duct, the air convection current which goes to an exhaust port from an inlet can be promoted, and ** prevented effectively can perform that the heat from the heat-source section transmits to the protected section. Moreover, since it is not necessary to use a fan fundamentally, it is possible to hold down the noise and power consumption that much.
[0010] Here, although the first and the second location can be suitably chosen according to the physical relationship of the configuration of an aeration duct, magnitude, a bore, the heat-source section, and the protected section etc., the configuration whose first location of the above is near [above-mentioned] the inlet is desirable. That is, since the inside of an aeration duct is circulated without circulating an elevated-temperature ambient atmosphere in an aeration duct as it is after cooling the elevated-temperature ambient atmosphere by the cooling section also in case the inhalation of air of the hot ambient atmosphere is carried out from an inlet, the thermal insulation effectiveness can be heightened more.
[0011] Furthermore, when it has the vertical section or ramp to which the above-mentioned aeration duct makes it a lower limit except the inlet, the configuration whose second location of the above is near the lower limit of the vertical section concerned or a ramp is desirable. That is, if the lower limit of a vertical section or a ramp is warmed, by the so-called chimney effect, the air convection current in an aeration duct can be promoted much more effectively, and the thermal insulation effectiveness can be heightened. In addition, about this chimney effect, the longer one of the die length of a vertical section or a ramp is desirable, and the lower limit of a vertical section is more desirable than the lower limit of a ramp. Moreover, since that desirable mode is indicated by various reference about this chimney effect, they can be designed to reference (for example, "heat cure design of electronic equipment" Nikkan Kogyo Shimbun p116- etc.).
[0012] Here, as the heat-source section, an anchorage device, a power unit, etc. are mentioned, for example. As the protected section, although age equipment and components are meant with heat, cleaning equipment, a developer, a middle imprint belt, a photo conductor, various kinds of electronic parts, etc. are mentioned, for example.
[0013] Moreover, when the above-mentioned heat-source section is an anchorage device, the configuration which prepares the first and the second inlet near feed opening of the anchorage device and the delivery opening, respectively is desirable. Namely, although it has feed opening and delivery opening, respectively in the side to which paper is made [that a record sheet is fed to an anchorage device, and] to deliver Since it is from these feeding opening and delivery opening for the heat ambient atmosphere inside an anchorage device to leak, and to come out, it is establishing the first and the second inlet in those near, respectively. Inhalation of air can be carried out without leaking and diffusing the heat ambient atmosphere which comes out to other equipments in image formation equipment, and the thermal insulation effectiveness can be further heightened by exhausting to the image formation equipment exterior. since a lot of heat and steams which are generated from the record sheet immediately after fixing exist in about 24 delivery opening of an anchorage device especially, while being able to exhaust the heat effectively, it can come out to also exhaust a steam and the bad influence by the steam can also be prevented. Furthermore, energy efficiency is not lowered in order not to cool the anchorage device itself directly. in addition -- the bad influence by the steam -- carrying out -- for example, a steam adheres and dews ** chute (conveyance guide), and when the waterdrop adheres also to a record sheet, it becomes the cause of record sheet plugging. ** In case it classifies with the after-treatment equipment of

image formation equipments, such as a sorter, record sheets will adhere and a record sheet will be irregular, because waterdrop adheres to a record sheet. ** The bad influence of rust being generated is mentioned to surrounding metals, such as a chute.
[0014]
[The gestalt by implementation of invention] Next, the gestalt of suitable operation of this invention is explained.
O the first embodiment drawing 1 -- this operative condition -- the configuration of the whole image formation equipment 1 which applied the thermal insulation equipment and it which start like is shown. this image formation equipment 1 -- the color printer of an electrophotography method -- it is -- the photo conductor drum 10, the corotron electrification machine 11, a photographic filter 12, the rotary development counter 13, the imprint drum 14, an anchorage device 2, cleaning equipment 15, the record sheet tray 16, conveyance roll pair 17 a-c, and a resist roll pair -- it consists of 18 and electronic substrate 19 grade. In addition, the dotted line shows the path of a record sheet.
[0015] Actuation of the color picture formation by this image formation equipment 1 is explained briefly. Photo conductor drum 10 front face rotated in the direction of the arrow head of drawing is uniformly electrified with the corotron electrification vessel 11. Based on the picture signal for every color from a personal computer etc., laser light is irradiated from a photographic filter 12, and the electrostatic latent image of the potential difference is formed in photo conductor drum 10 front face charged uniformly. The electrostatic latent image is made into **** with the rotary development counter 13. Here, the toner image of yellow is formed first. the timing to which the toner image arrives at a nip location with the imprint drum 14 with rotation of the photo conductor drum 10 -- the record sheet tray 16 to a record sheet -- every one sheet -- conveyance roll pair 17 a-c and a resist roll pair -- 18 is conveyed, the nip part of the photo conductor drum 10 and the imprint drum 14 is reached, and the toner image of yellow is imprinted to a record sheet. The residual toner which the record sheet followed to the imprint drum, rotated it as it was, and remained on the photo conductor drum 10, without imprinting is recovered by cleaning equipment 15.
[0016] After it repeats this process about each color of cyanogen, a Magenta, and black and the toner image of four colors puts on a record sheet, a record sheet exfoliates from the imprint drum 14, and is conveyed to an anchorage device 2. Then, by passing the nip section of a heating roller 21 and a pressure roll 22, you make it fixed to record material according to an operation with those heat and pressures, and it considers as a permanent image, and is discharged out of image formation equipment 1, and color picture formation ends the toner image which is not established [which is supported on the record sheet].
[0017] Drawing 2 shows the thermal insulation equipment circumference concerning this embodiment. This thermal insulation equipment is thermal insulation equipment which interrupts transfer of the heat from the heat-source section to the protected section 3 in image formation equipment 1. The aeration duct 4 which is equipped with the exhaust port 42 established more nearly up than the above-mentioned heat-source section 2 and the inlet 41 caudad prepared rather than the exhaust port 42, and is prepared between the above-mentioned heat-source section and the above-mentioned protected section 3, While having heat exchange equipment which emits the heat absorbed from the cooling section 51 to a radiator 52 and installing the above-mentioned cooling section 51 in the first location in the aeration duct 4, the above-mentioned radiator 52 is installed in the second location by the side of the exhaust port 42 in the aeration duct 4 rather than the first location concerned.
[0018] this embodiment -- the heat-source section -- an anchorage device 2 -- it is a heating roller 21 in more detail. Moreover, the protected section 3 assumes the electronic substrate 19 with which it exists in near comparatively and the anchorage device 2 which is the heat-source section exists above an anchorage device 2 as protected section 3a here, and the cleaning equipment 15 which exists in the feeding side of an anchorage device 2 as protected section 3b.
[0019] The aeration duct 4 is formed among the protected sections 3a and b as this heat-source section, and is. Moreover, the exhaust port 42 is established above the heat-source section and the protected section 3, and the inlet 41 is established in the flank of the heat-source section which is the lower part of an exhaust port 42. Although the structure of the image formation equipment 1 interior which applies it could design the configuration of this aeration duct 4, magnitude, etc. to arbitration, in consideration of physical relationship with other equipments in image formation equipment 1, it considered as the configuration of the shape of a crank which consists of a vertical section A, a horizontal level B, and a vertical section C as shown in drawing 2

in this embodiment. Thus, it is more desirable to shorten the die length of a horizontal level B as much as possible from a viewpoint which promotes the convection current in the aeration duct 4, even when the configuration of the aeration duct 4 cannot be perpendicularly constituted from physical relationship with other equipments in image formation equipment 1 etc. Moreover, if possible, it is desirable to make this horizontal level B incline up to the flow of the air in the aeration duct 4, and it is not desirable to consider as the arrangement made to incline caudad to the flow of air conversely. Moreover, it is desirable that the boundary line of a vertical section A, and a horizontal level B, a horizontal level B and a vertical section C also enlarges radius of curvature, and forms it as smoothly as possible. Furthermore, as for the die length of vertical sections A and C, it is desirable to constitute as for a long time as possible.

[0020] The heat exchange equipment which emits the heat absorbed from the cooling section 51 to a radiator 52 Peltier device 50 which is a heat-transfer element which cools the whole surface (cooling surface 50 (C)), and goes up the temperature of other fields (heat sinking plane 50 (H)) by supplying power, The radiator 52 which consists of a part of cooling section 51 4 prepared in aeration duct 4 inside in contact with the cooling surface 50 of the Peltier device 50 (C), i.e., aeration duct, a fin-like member 512, and a heat sink 521 and the fin-like member 522, An end is attached in the heat sinking plane 50 of Peltier device 50 (H), and the other end consists of the heat pipe 53 attached in the heat sink 521 of a radiator 52.

[0021] Drawing 3 explains more the physical relationship of the heat exchange equipment and the aeration duct 4 concerning this embodiment to a detail. The cooling surface 50 of four Peltier device 50 a-d (C) contacts about (the first location) 41 aeration duct 4 inlet (metal) external surface, and is attached. It is drawing 4 (b) which showed aeration duct 4 inside of the part in which the cooling surface 50 of Peltier device 50 (C) is attached. Thus, two or more fin-like members 512 are formed in the inside, and the cooling section 51 is constituted with some metal aeration ducts 4.

[0022] On the other hand, the end of the heat pipe 53 equipped with very high thermal conductivity is attached in the heat sinking plane 50 of Peltier device 50 (H). the other end of the heat pipe 53 is attached in the whole surface of a heat sink 521 -- having -- the heat sink 521 -- on the other hand -- being alike -- two or more fin-like members 522 are formed. Here, near the lower limit of the vertical section C of the aeration duct 4 (the second location), the notch (the dotted-line slash section D of drawing 3) of the same configuration as a heat sink 521 is prepared, and the heat sink 521 is designed possible [anchoring]. Drawing 4 (a) shows the radiator 52 of the aeration duct 4 interior in an anchoring condition. Thus, the radiator 52 is constituted by a heat sink 521 and two or more fin-like members 522.

[0023] Drawing 5 explains the control system of Peltier device 50 using a block diagram. This control system consists of the main control unit of image formation equipment 1, a power unit, Peltier device 50 control section, and Peltier device 50, and controls actuation of Peltier device 50 according to the system operating status of image formation equipment 1. That is, since many heat occurs from an anchorage device 2 when image formation equipment 1 is working, it is because it is necessary to operate Peltier device 50 and to promote the convection current of the air in the aeration duct 4, it is necessary to reduce supply of the power to Peltier device 50 when image formation equipment 1 is standing by, and it is necessary to save power consumption.

[0024] The main control unit of image formation equipment 1 transmits the operation information on image formation equipment 1 to Peltier device 50 control section, Peltier device 50 control section which received it supplies the power supplied from a power unit at the time of operation to Peltier device 50, and, specifically, it is controlling not to supply at the time of a halt. In addition, although it is also possible to perform the so-called "turning-on-and-off" control in this way, Peltier device 50 control section may change the power supplied to Peltier device 50 multistage story-wise and continuously. For example, when forming a lot of images continuously, more power may be supplied to Peltier device 50, immediately after a halt of image formation, predetermined time usual power may be supplied to Peltier device 50, the amount of supply may be gradually reduced with the passage of time, and, finally it may stop. By performing such control, it is more compatible with altitude in the thermal insulation effectiveness and saving of power consumption.

[0025] Actuation of the thermal insulation equipment concerning this embodiment in the case of supplying power to Peltier device 50 is explained. If power is supplied to Peltier device 50, it will carry out endoergic from the cooling surface 50 (C). This cooling surface 50 (C) cools the cooling section 51 512 which exists in that interior through the metal aeration duct 4, i.e., a fin-like member. That is, an about 41 inlet [of the aeration duct 4 interior] ambient atmosphere is cooled. On the other hand, the heat sinking plane 50 of Peltier device 50

(H) is heated, and the heat is efficiently conducted with the heat pipe 53 attached in the heat sinking plane 50 (H), and is told to the heat sink 521 in which the other end of a heat pipe 53 is attached, and it heats the fin-like member 522. That is, the ambient atmosphere near the vertical section C lower limit of the aeration duct 4 interior is heated.
 [0026] Then, a temperature gradient arises about 41 inlet in the aeration duct 4, and near vertical section C, and the convection current of the air in the aeration duct 4 occurs by the chimney effect. That is, surrounding air is inhaled from an inlet 41 and the flow of the air exhausted from an exhaust port 42 through a vertical section A, a horizontal level B, and a vertical section C arises. Since the ambient atmosphere near the lower limit of a vertical section C can warm effectively especially, a chimney effect is demonstrated notably and promotes the convection current. In this embodiment, since the inlet 41 is established in about 23 feed opening of an anchorage device 2, it can carry out the inhalation of air of the heat ambient atmosphere which leaks from the feed opening 23 effectively, and can exhaust it to the image formation equipment 1 exterior.

[0027] Moreover, since a ventilating fan is not used like before for thermal insulation, the noise and power consumption are reducible. Furthermore, in this embodiment, since the heat sinking plane 50 of Peltier device 50 (H) is ****(ing) with the anchorage device 2 (refer to drawing 2), it can be useful also to keeping an anchorage device 2 indirect to predetermined temperature, and the power consumption of the image formation equipment 1 whole can be stopped also at this point.

[0028] modification drawing 6 -- the first operative condition -- the modification of the thermal insulation equipment applied like is shown, and it has the ventilating-fan unit 6 in the delivery close-attendants side of an anchorage device 2. This ventilating-fan unit is constituted by the path section 61 and the ventilating fan 61 for incorporating the heat ambient atmosphere which leaks and comes out of the feed opening 23.

[0029] Drawing 7 explains the control system of Peltier device 50 and a ventilating fan using a block diagram. This control system has the ventilating-fan control section and ventilating fan 60 other than the control system of the first embodiment, and controls actuation of Peltier device 50 and a ventilating fan according to the system operating status of image formation equipment 1. That is, since many heat occurs from an anchorage device 2 when image formation equipment 1 is working, it is necessary to operate Peltier device 50 and a ventilating fan 60, and to promote the convection current of the air in the aeration duct 4, and to exhaust compulsorily with a ventilating fan 60. It is for, stopping actuation of a ventilating fan 60 on the other hand, when image formation equipment 1 has stopped, exhausting heat in an operation of only Peltier device 50, and aiming at reduction of the noise.

[0030] Since control of Peltier device 50 is the same as that of the first embodiment, if control of a ventilating fan is explained concretely, the main control unit of image formation equipment 1 will transmit the operation information on image formation equipment 1 to a ventilating-fan control section, the ventilating-fan control section which received it will supply the power supplied from a power unit at the time of operation to a ventilating fan 60, and it will control not to supply at the time of a halt. In addition, although it is also possible to perform the so-called "turning-on-and-off" control in this way, a ventilating-fan control section may change the power supplied to a ventilating fan multistage story-wise and continuously. For example, when forming a lot of images continuously, more power may be supplied to a ventilating fan 60, immediately after a halt of image formation, predetermined time usual power may be supplied to a ventilating fan 60, the amount of supply may be gradually reduced with the passage of time, and, finally it may stop. By performing such control, it is more compatible with altitude in the thermal insulation effectiveness and saving of power consumption.

[0031] Moreover, you may control for Peltier device 50 and a ventilating fan 60 to operate independently in this way, and also to cooperate mutually and to operate. For example, a user may choose beforehand whether only Peltier device 50 is operated in the usual image formation, only when there are many heating values generated so that a lot of images may be formed continuously, a ventilating fan 60 may be used auxiliary, and priority is given to quietness, and Peltier device 50 is operated preferentially, or priority is given to thermal insulation nature and both Peltier device 50 and the ventilating fan 60 are always operated. By performing such control, the control which **(ed) with each situation of each image formation equipment 1 or a user is attained.

[0032] Thus, since it has the ventilating-fan unit 6 to about 24 delivery opening of an anchorage device 2, the heat and steam generated from the heat ambient atmosphere which leaks and comes out of the delivery opening 24, or the record sheet immediately after fixing can be directly exhausted out of image formation equipment 1. And since it uses together with Peltier device 50, exhaust air capacity has been lower than the conventional

thing enough, and miniaturization of a ventilating fan 60 and mitigation of power consumption and the noise can be aimed at.

[0033] O The second embodiment drawing 8 shows the thermal insulation equipment circumference of the image formation equipment 1 concerning this embodiment. and also this thermal insulation equipment has established the first and the second inlet 41 in the feed opening 23 and about 24 delivery opening of an anchorage device 2, respectively -- the first operative condition -- it is the same configuration as the thermal insulation equipment applied like.

[0034] In the first embodiment, although the configuration of the aeration duct 4 was a crank-like, in this embodiment, it attaches vertical section A' in the aeration duct 4 of the shape of the crank further, and makes it h-like configuration. Moreover, in the lower limit of a vertical section A and A', it has the first inlet 41a and second inlet 41b, respectively. Moreover, the upper limit of vertical section A' is connected with the aeration duct 4.

[0035] Drawing 9 explains more the physical relationship of the heat exchange equipment and the aeration duct 4 concerning this embodiment to a detail. Cooling surface 50 a-d (C) of four Peltier device 50 a-d contacts about (the first location) 41 inlet [of the aeration duct 4 vertical section (metal) A / first] external surface, and is attached, and cooling surface 50 e-h (C) of other four Peltier device 50 e-h contacts about (the first location) 41 inlet [of aeration duct 4 vertical-section A' (metal) / second] external surface, and is attached. It is drawing 4 (b) which showed aeration duct 4 inside of the part in which the cooling surface 50 of Peltier device 50 (C) is attached like the first embodiment. Thus, two or more fin-like members 512 are formed in the inside, and the cooling section 51 is constituted with some metal aeration ducts 4.

[0036] On the other hand, the end of the heat pipe 53 equipped with very high thermal conductivity is attached in heat sinking plane 50 a-h (H) of a total of eight Peltier device 50 a-h, respectively. the other end of the heat pipe 53 is attached in the whole surface of a heat sink 521 -- having -- the heat sink 521 -- on the other hand -- being alike -- two or more fin-like members 522 are formed. Here, near the lower limit of the vertical section C of the aeration duct 4 (the second location), the notch (the dotted-line slash section D of drawing 9) of the same configuration as a heat sink 521 is prepared like the first embodiment, and the heat sink 521 is designed possible [anchoring]. Drawing 4 (a) shows the radiator 52 of the aeration duct 4 interior in an anchoring condition. Thus, the radiator 52 is constituted by a heat sink 521 and two or more fin-like members 522.

[0037] Although the motion control of Peltier device 50 may be the same as that of the first embodiment, generally Since heat and a steam have more about 24 delivery opening than about 23 feed opening of an anchorage device 2, If it is made [more] than Peltier device 50 a-d in which the power supplied to Peltier device 50 e-h prepared near the second inlet 41b is formed near the first inlet 41a, the convection current of the air in the aeration duct 4 by the chimney effect can be promoted more effectively. Moreover, power can be supplied only to Peltier device 50 a-d prepared in the first about 41 inlet at the time of standby of image formation equipment, and control which supplies power to all Peltier device 50 a-h can also be performed at the time of operation.

[0038] Actuation of the thermal insulation equipment concerning this embodiment in the case of supplying power to Peltier device 50 is explained. If power is supplied to Peltier device 50, like the first embodiment, a temperature gradient will arise the first in the aeration duct 4 and the second about 41 inlet, and near vertical section C, and the convection current of the air in the aeration duct 4 will occur by the chimney effect. That is, surrounding air is inhaled from the first inlet 41, surrounding air is inhaled from the flow of the air exhausted from an exhaust port 42 through a vertical section A, a horizontal level B, and a vertical section C, and the second inlet 41, and the flow of vertical section A' and the air exhausted from an exhaust port 42 through a vertical section C arises. Since the ambient atmosphere near the lower limit of a vertical section C can warm effectively especially, a chimney effect is demonstrated notably and promotes the convection current. In this embodiment, since the first and the second inlet 41 are established in about 23 feed opening and about 24 delivery opening of an anchorage device 2, the inhalation of air also of the heat ambient atmosphere which leaks from the feed opening 23 and the delivery opening 24, and the heat and steam from a record sheet immediately after fixing can be carried out effectively, and it can exhaust to the image formation equipment 1 exterior.

[0039] Moreover, since a ventilating fan is not used like before for thermal insulation, the noise and power consumption are reducible. Furthermore, in this embodiment, since the heat sinking plane 50 of Peltier device

50 (H) is ****(ing) with the anchorage device 2 (refer to drawing 8), it can be useful also to keeping an anchorage device 2 indirect to predetermined temperature, and the power consumption of the image formation equipment 1 whole can be stopped also at this point.
[0040] In addition, the first and the second embodiment make the aeration duct 4 metal. Although it has composition which cools circumference ******** by contacting the cooling surface 50 of Peltier device 50 (C) into this aeration duct 4, attaching it, and forming the fin-like member 512 in aeration duct 4 inside corresponding to it For example, if it is when resin with low thermal conductivity etc. constitutes the aeration duct 4 Prepare the heat sink made from aluminum in the aeration duct 4, and the Peltier device cooling surface 50 (C) and/or its heat sink are made to estrange from an aeration (product made of resin) duct. (Resin) By connecting the Peltier device cooling surface 50 (C) and a heat sink by the heat-conduction sections (heat pipe etc.), the aeration (product made of resin) duct 4 can also be considered as the configuration which cools only a heat sink intensively, without cooling.
[0041]
[Effect of the Invention] According to invention according to claim 1, a temperature gradient arises in the near ambient atmosphere of the first and the second location, the convection current of the air in an aeration duct is produced by the chimney effect, and transfer of the heat from the heat-source section to the protected section can be interrupted.
[0042] Since according to invention according to claim 2 the heat ambient atmosphere by which inhalation of air was carried out from the inlet is immediately cooled by the way cooling section and the cooled air convects the inside of an aeration duct, the still higher thermal insulation effectiveness is acquired.
[0043] According to invention according to claim 3, a chimney effect can be promoted further and the higher thermal insulation effectiveness as a result is acquired.
[0044] Before a lot of heat ambient atmospheres and steams which leak near the anchorage device feed opening and near the delivery opening, and come out diffuse in image formation equipment, in order according to invention according to claim 4 to carry out inhalation of air from the way first and the second inlet immediately and to exhaust out of image formation equipment, the still higher thermal insulation effectiveness is acquired.

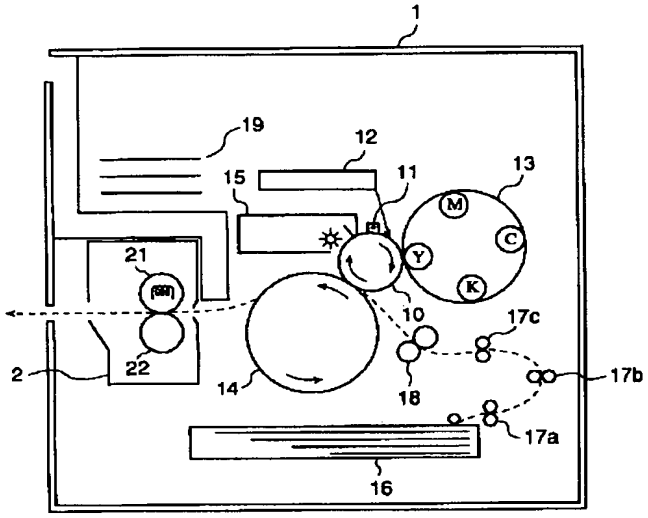
[Translation done.]

* NOTICES *

1.This document has been translated by computer. So the translation may not reflect the original precisely.
2.**** shows the word which can not be translated.
3.In the drawings, any words are not translated.

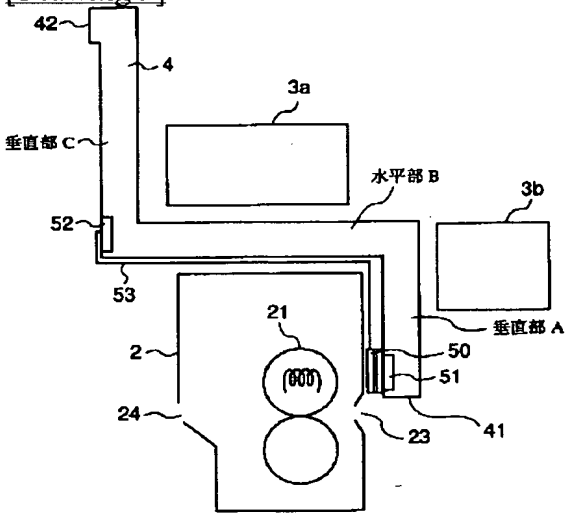
DRAWINGS

[Drawing 1]



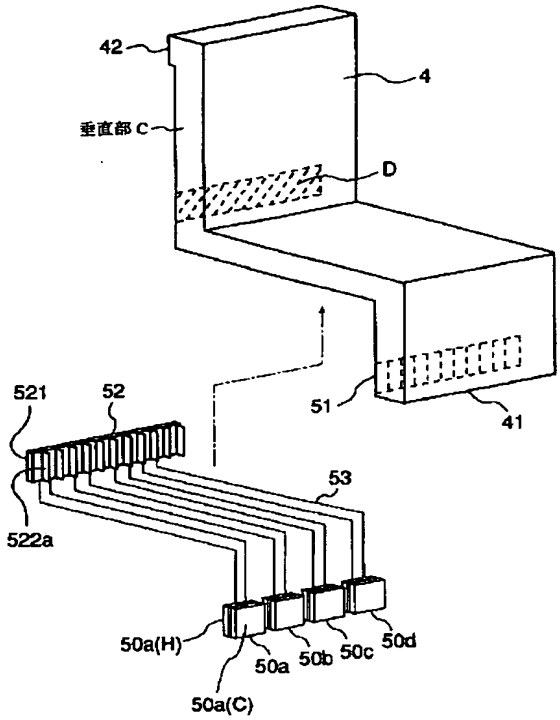
1: 画像形成装置
2: 定着装置
21: 加熱ロール

[Drawing 2]



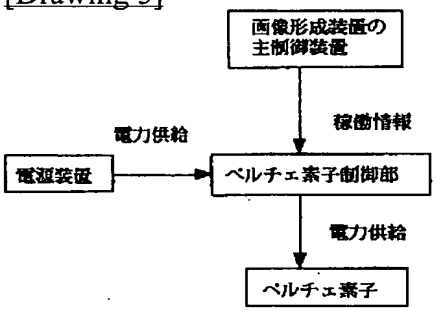
3: 被保護部
4: 通気ダクト
23: 給紙口
24: 排紙口
41: 吸気口
42: 排気口
50: ヘルチェ素子
51: 冷却部
52: 放熱部
53: ヒートパイプ

[Drawing 3]



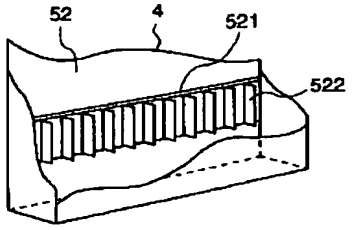
50(C): 冷却面
50(H): 放熱面
521: 放熱板
522: フィン状部材

[Drawing 5]

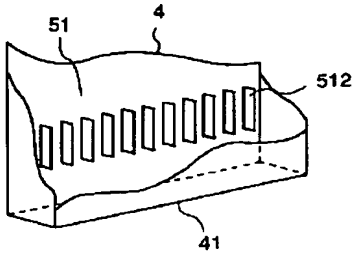


[Drawing 4]

(a)

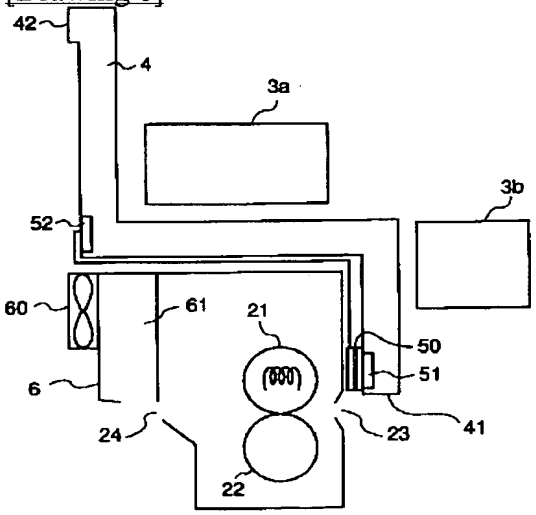


(b)



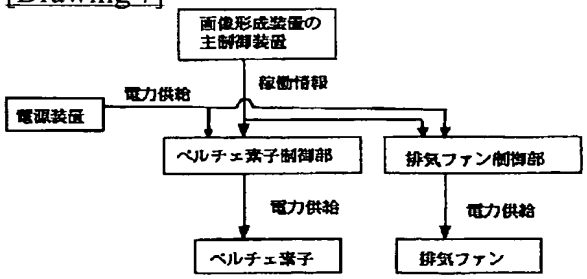
512: フィン状部材

[Drawing 6]

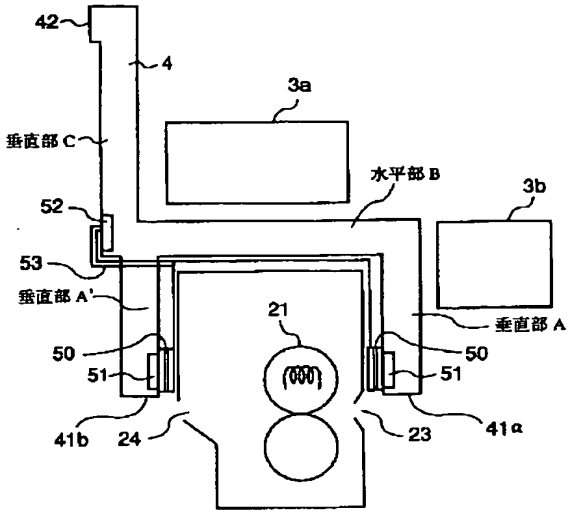


6: 排気ファンユニット
60: 排気ファン
61: 通路部

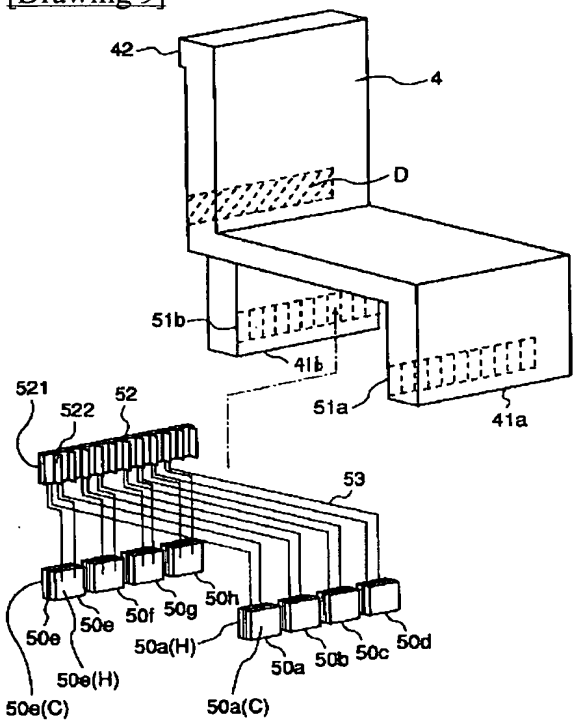
[Drawing 7]



[Drawing 8]



[Drawing 9]



[Translation done.]